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**Fujisawa**

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(54) **DATA PROCESSING APPARATUS CAPABLE OF OPERATING IN POWER SAVING MODE, CONTROL METHOD OF DATA PROCESSING APPARATUS, AND STORAGE MEDIUM**

(71) Applicant: **CANON KABUSHIKI KAISHA**, Tokyo (JP)

(72) Inventor: **Minoru Fujisawa**, Machida (JP)

(73) Assignee: **CANON KABUSHIKI KAISHA**, Tokyo (JP)

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(51) **Int. Cl.**
***G06F 1/32*** (2006.01)

(52) **U.S. Cl.**
CPC ..... ***G06F 1/32*** (2013.01); ***G06F 1/3209*** (2013.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

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*Primary Examiner* — Kim Huynh
*Assistant Examiner* — Vincent Chang
(74) *Attorney, Agent, or Firm* — Carter, DeLuca, Farrell & Schmidt, LLP

(57) **ABSTRACT**

The present invention aims to easily maintain a state of less power consumption, by providing a data processing apparatus comprising: a registering unit to register therein data for identifying a packet; a receiving unit to receive a packet transmitted through a network; a determining unit to, in a case where the receiving unit receives the packet while the data processing apparatus is operating in a power saving mode, determine whether or not to return the data processing apparatus from the power saving mode, on the basis of the data registered in the registering unit; an analyzing unit to perform an analysis process to the packet flowing on the network; a displaying unit to display a screen indicating a result of the analysis process by the analyzing unit; and an indicating unit to indicate the data to be registered in the registering unit, through the screen displayed by the displaying unit.

**8 Claims, 13 Drawing Sheets**

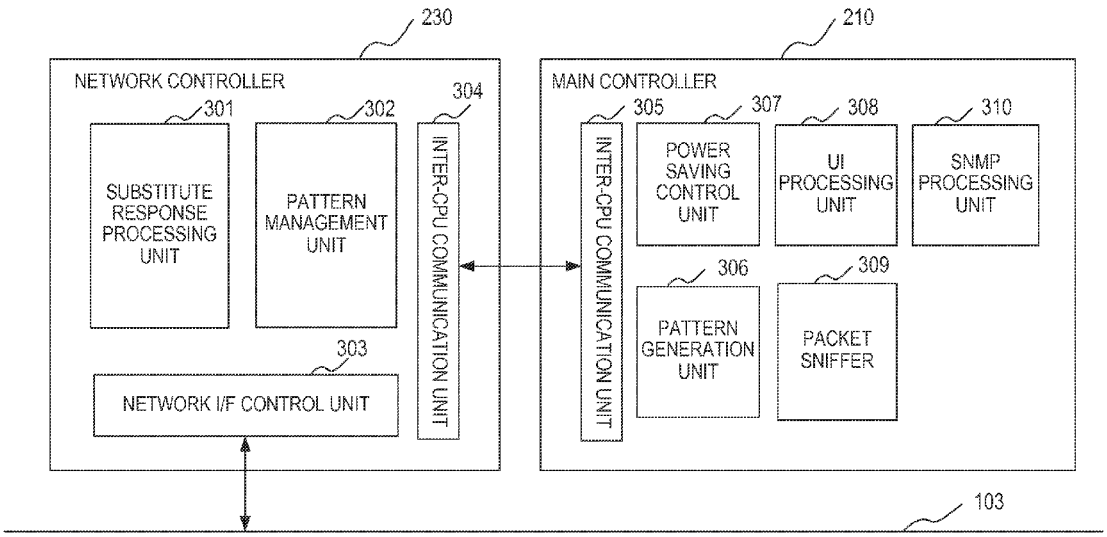


FIG. 1

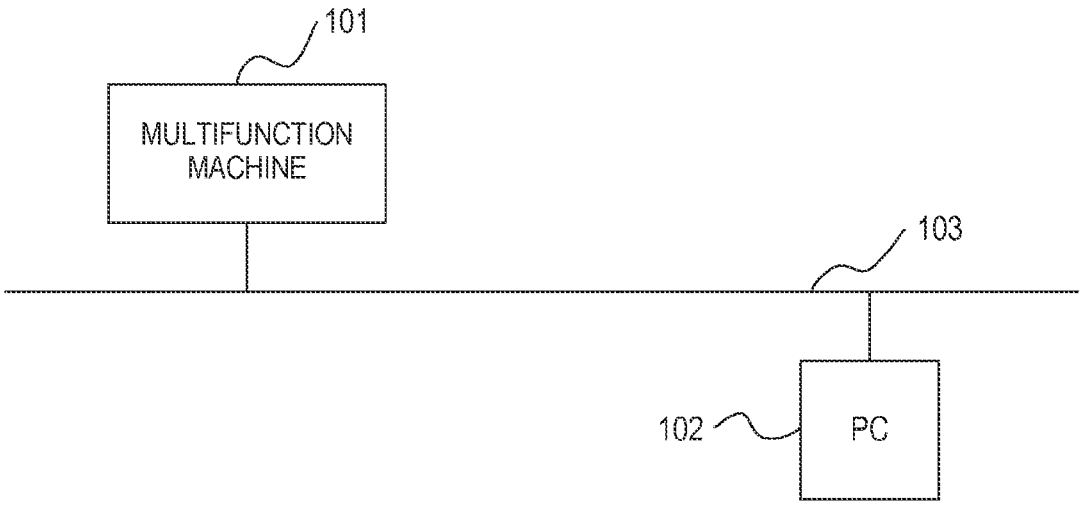


FIG. 2

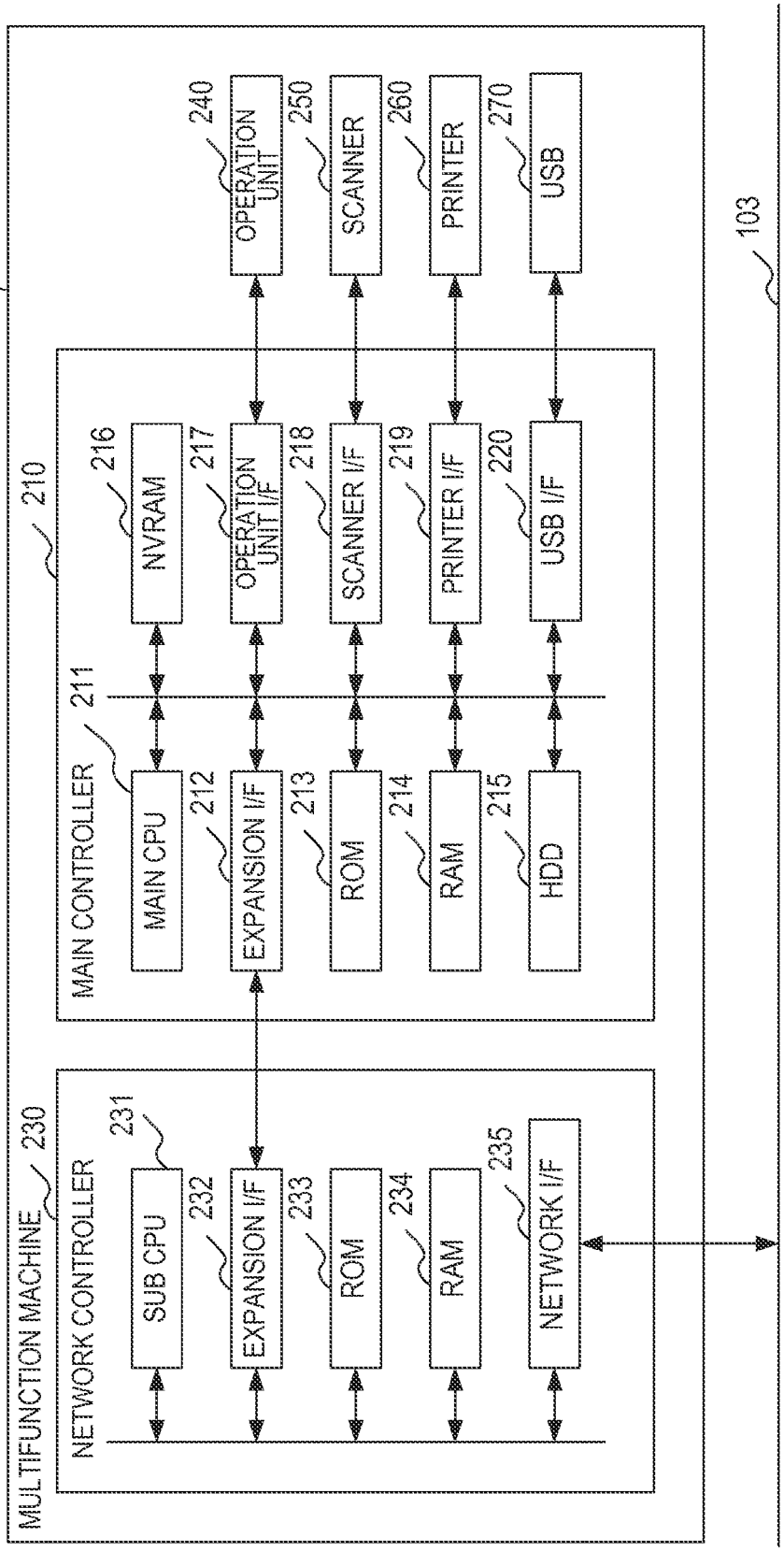

101
MULTIFUNCTION MACHINE
230
NETWORK CONTROLLER
231
SUB CPU
232
EXPANSION I/F
233
ROM
234
RAM
235
NETWORK I/F
210
MAIN CONTROLLER
211
MAIN CPU
212
EXPANSION I/F
213
ROM
214
RAM
215
HDD
216
NVRAM
217
OPERATION UNIT I/F
218
SCANNER I/F
219
PRINTER I/F
220
USB I/F
240
OPERATION UNIT
250
SCANNER
260
PRINTER
270
USB
103

FIG. 3

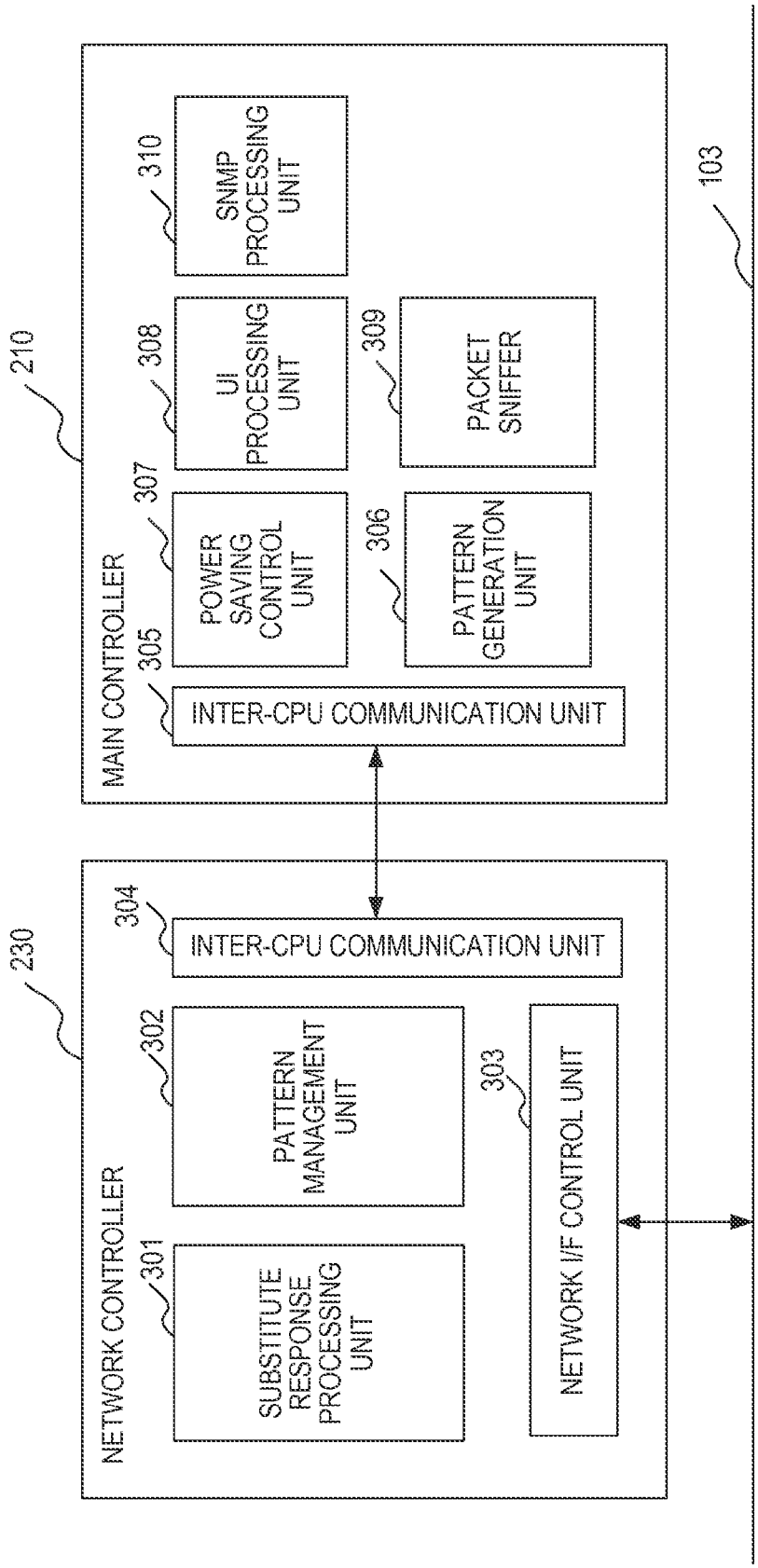

103
210
MAIN CONTROLLER
310
SNMP PROCESSING UNIT
308
UI PROCESSING UNIT
309
PACKET SNIFFER
307
POWER SAVING CONTROL UNIT
306
PATTERN GENERATION UNIT
305
INTER-CPU COMMUNICATION UNIT
230
NETWORK CONTROLLER
304
INTER-CPU COMMUNICATION UNIT
302
PATTERN MANAGEMENT UNIT
303
NETWORK I/F CONTROL UNIT
301
SUBSTITUTE RESPONSE PROCESSING UNIT

FIG. 4

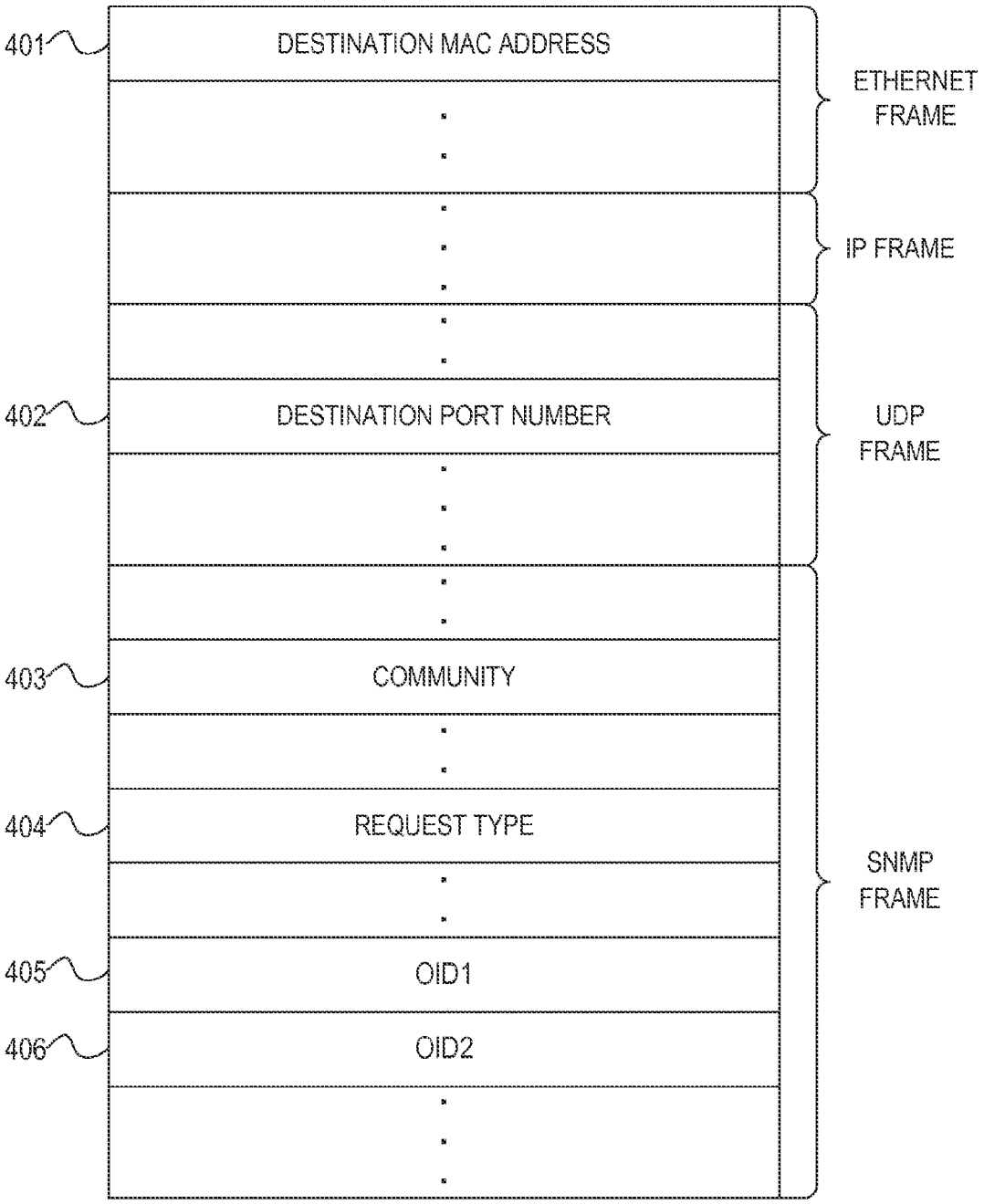

401
DESTINATION MAC ADDRESS
ETHERNET FRAME
IP FRAME
402
DESTINATION PORT NUMBER
UDP FRAME
403
COMMUNITY
404
REQUEST TYPE
SNMP FRAME
405
OID1
406
OID2

FIG. 5

| 501 PACKET TYPE | 502 REQUEST TYPE | 503 OID | 504 INDEX | 505 NUMBER OF TIMES OF REQUESTS |
|---|---|---|---|---|
| UNICAST | GetRequest | 1.3.6.1.2.1.25.3.2.1.5.1 | 0 | 34 |
| UNICAST | GetRequest | 1.3.6.1.2.1.25.3.5.1.1.1 | | 19 |
| BROADCAST | GetRequest | 1.3.6.1.2.1.1.2.0 | 7 | 16 |
| MULTICAST | GetRequest | 1.3.6.1.2.1.1.2.0 | 7 | 5 |
| UNICAST | SetRequest | 1.3.6.1.2.1.25.3.5.1.1.2 | | 2 |
| . . . | | | | |

FIG. 6

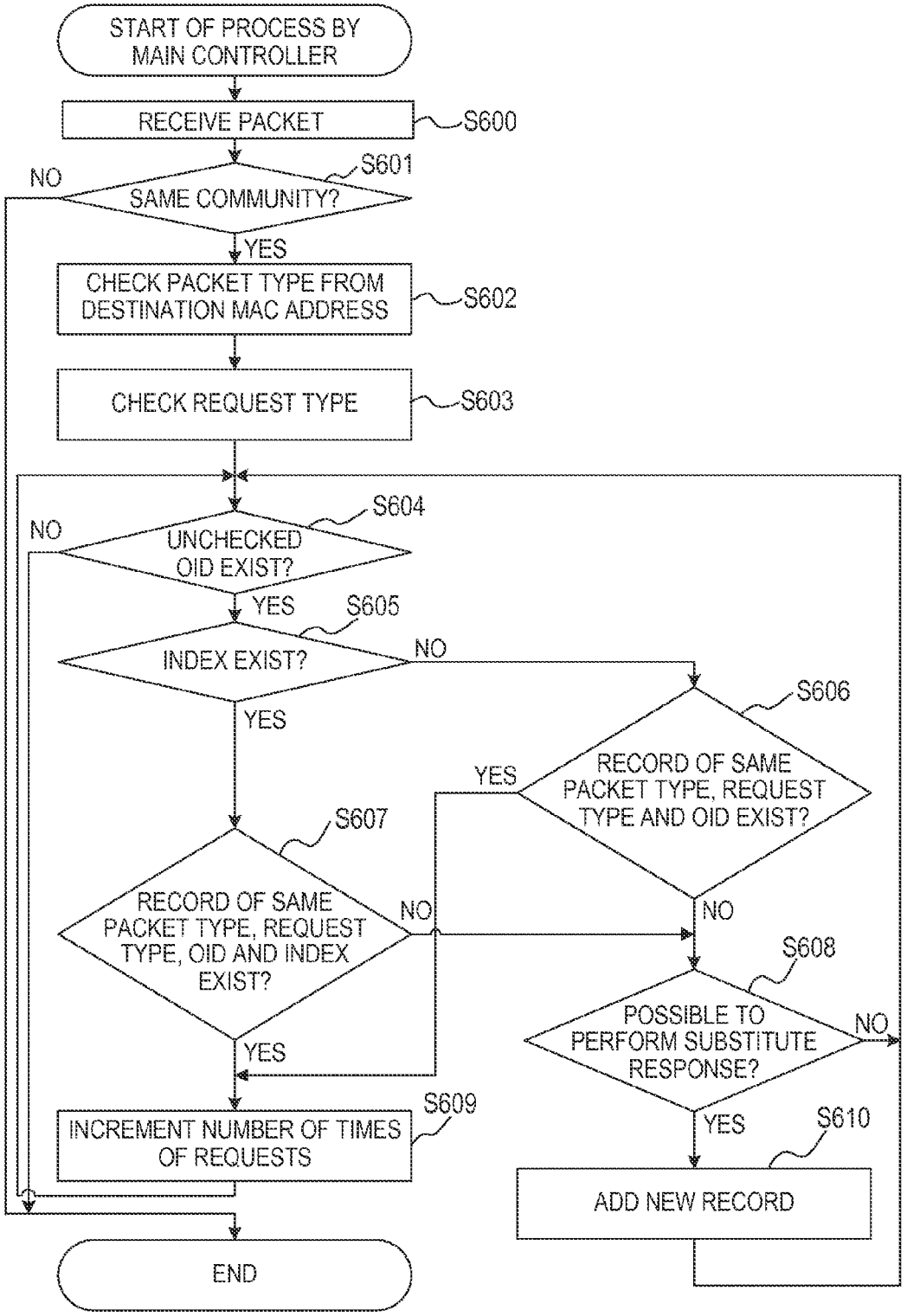

START OF PROCESS BY MAIN CONTROLLER
RECEIVE PACKET
S600
S601
NO
SAME COMMUNITY?
YES
CHECK PACKET TYPE FROM DESTINATION MAC ADDRESS
S602
CHECK REQUEST TYPE
S603
S604
NO
UNCHECKED OID EXIST?
YES
S605
INDEX EXIST?
NO
YES
S606
YES
RECORD OF SAME PACKET TYPE, REQUEST TYPE AND OID EXIST?
S607
RECORD OF SAME PACKET TYPE, REQUEST TYPE, OID AND INDEX EXIST?
NO
NO
S608
POSSIBLE TO PERFORM SUBSTITUTE RESPONSE?
NO
YES
YES
S609
INCREMENT NUMBER OF TIMES OF REQUESTS
S610
ADD NEW RECORD
END

FIG. 7

```
<?xml Version="1.0" encoding="utf-8"?>
  <D:pattetrn xmlns:D="S3:">
    <D:array>
      <D:port>161</D:port>                                   701
      <D:protocol>snmp</D:protocol>                          702
      <D:comm>0</D:comm>                                     703
      <D:state>1</D:state>                                   704
      <D:operation>0</D:operation>                           705
      <D:overwrite>0</D:overwrite>                           706
      <D:request>32</D:request>                              707
      <D:scope>public</D:scope>                              708
      <D:type>1.3.6.1.2.1.25.3.2.1.2.2</D:type>              709
      <D:resval>0</D:resval>                                 710
       <D:type>1.3.6.1.2.1.25.3.2.1.2.1</D:type>
          <D:index0>1</D:index0>                             711
    </D:array>
    <D:array>
     .
     .
  </D:pattern>
```

FIG. 8

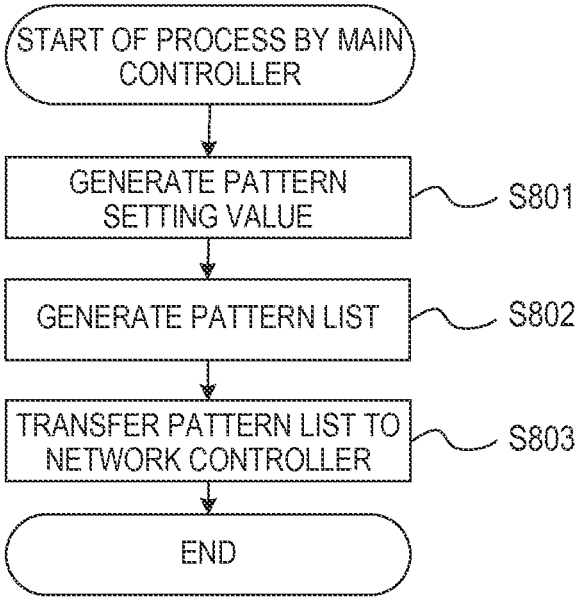

START OF PROCESS BY MAIN CONTROLLER
GENERATE PATTERN SETTING VALUE
S801
GENERATE PATTERN LIST
S802
TRANSFER PATTERN LIST TO NETWORK CONTROLLER
S803
END

FIG. 9

901

| | | |
|---|---|---|
| DESTINATION PORT NUMBER | 161 | |
| PROTOCOL NAME | SNMP | |
| PATTERN SETTING ENABLED/DISABLED | 1 | |
| OPERATION TYPE | 0 | |
| PATTERN SETTING UPDATABLE/NON-UPDATABLE | 0 | |
| PACKET TYPE | 0 | |
| PATTERN[0] | REQUEST | 32 |
| | SCOPE | public |
| | TYPE | 1.3.6.1.2.1.25.3.2.1.2.2 |
| | resval | 0 |
| | TYPE | 1.3.6.1.2.1.25.3.2.1.2.1 |
| | index[0] | 1 |
| . | . | . |
| . | . | . |
| . | . | . |

FIG. 10

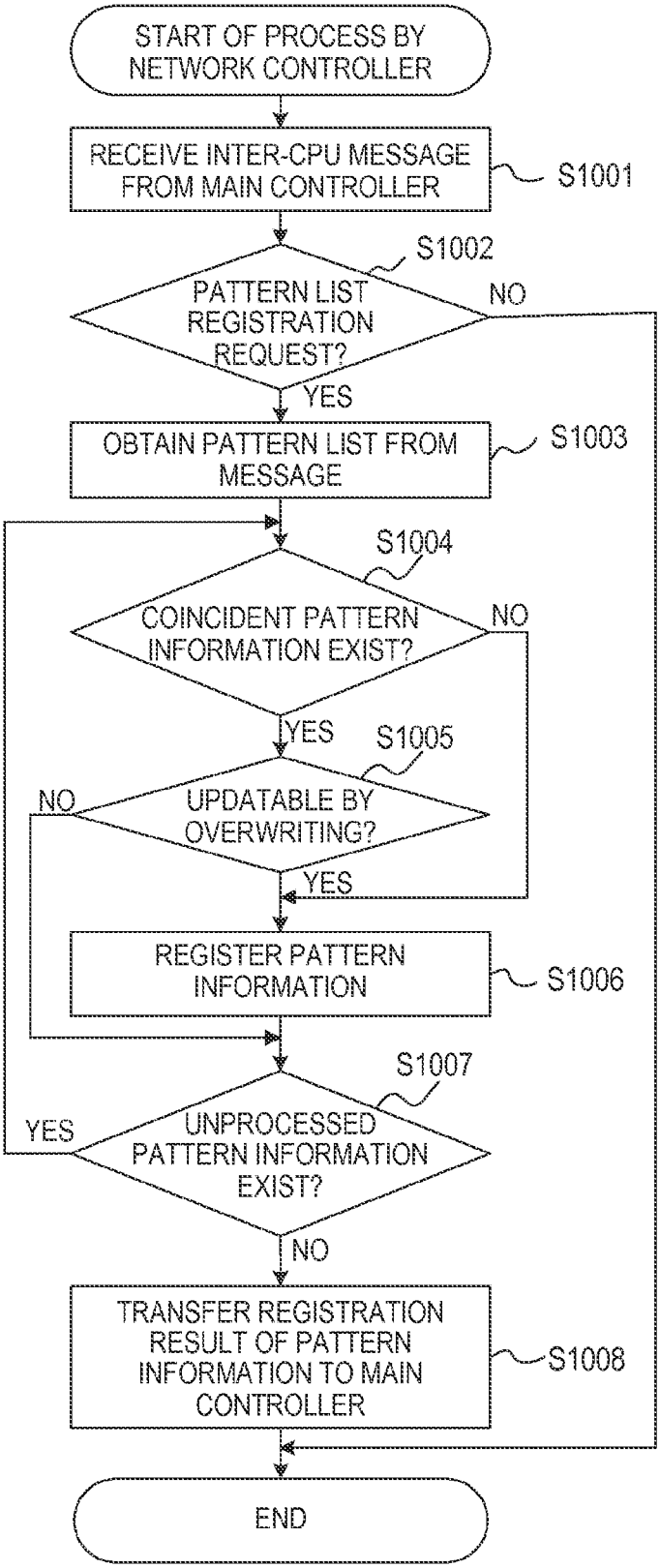

START OF PROCESS BY NETWORK CONTROLLER
RECEIVE INTER-CPU MESSAGE FROM MAIN CONTROLLER
S1001
S1002
PATTERN LIST REGISTRATION REQUEST?
NO
YES
OBTAIN PATTERN LIST FROM MESSAGE
S1003
S1004
COINCIDENT PATTERN INFORMATION EXIST?
NO
YES
S1005
UPDATABLE BY OVERWRITING?
NO
YES
REGISTER PATTERN INFORMATION
S1006
S1007
UNPROCESSED PATTERN INFORMATION EXIST?
YES
NO
TRANSFER REGISTRATION RESULT OF PATTERN INFORMATION TO MAIN CONTROLLER
S1008
END

FIG. 11

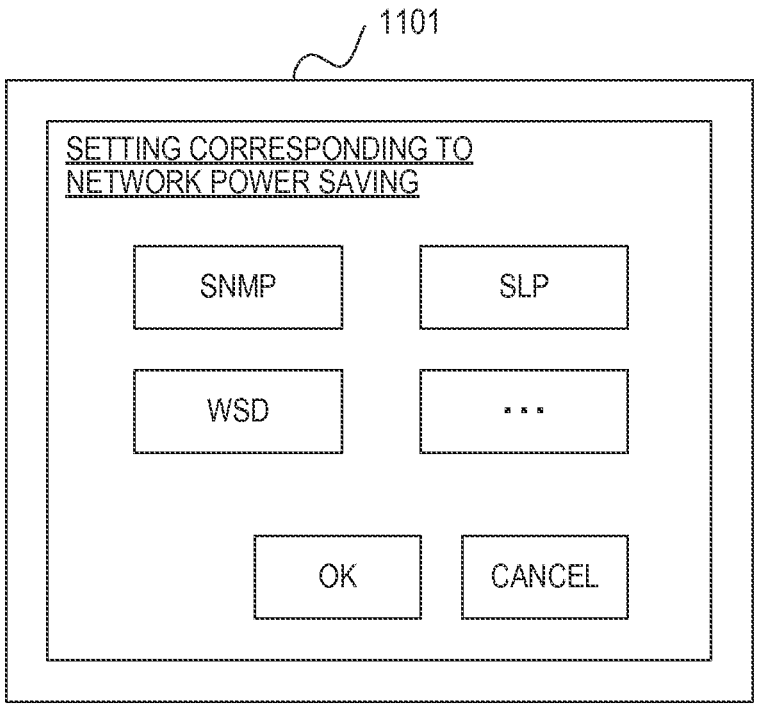

1101
SETTING CORRESPONDING TO NETWORK POWER SAVING
SNMP
SLP
WSD
...
OK
CANCEL

FIG. 12

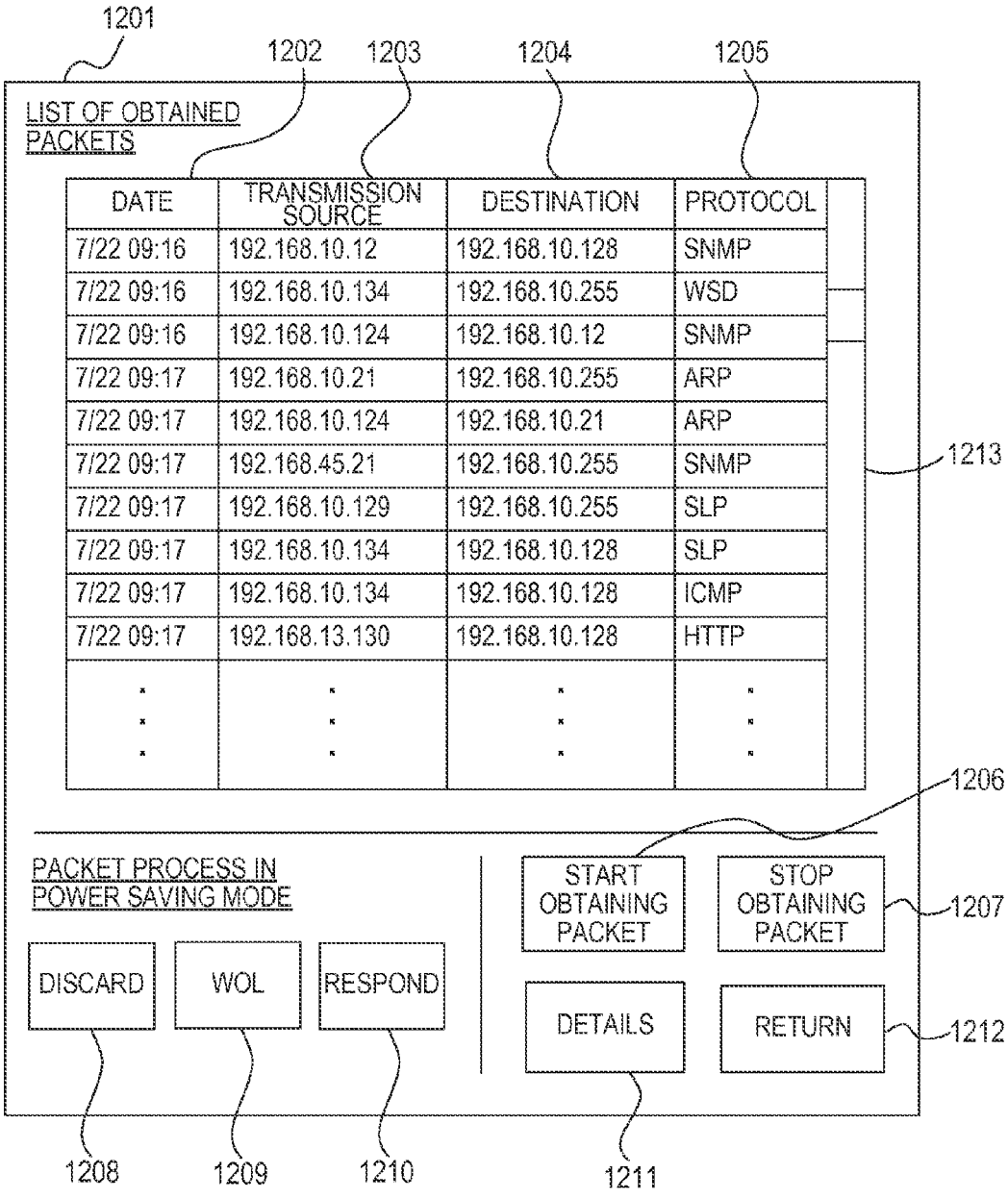
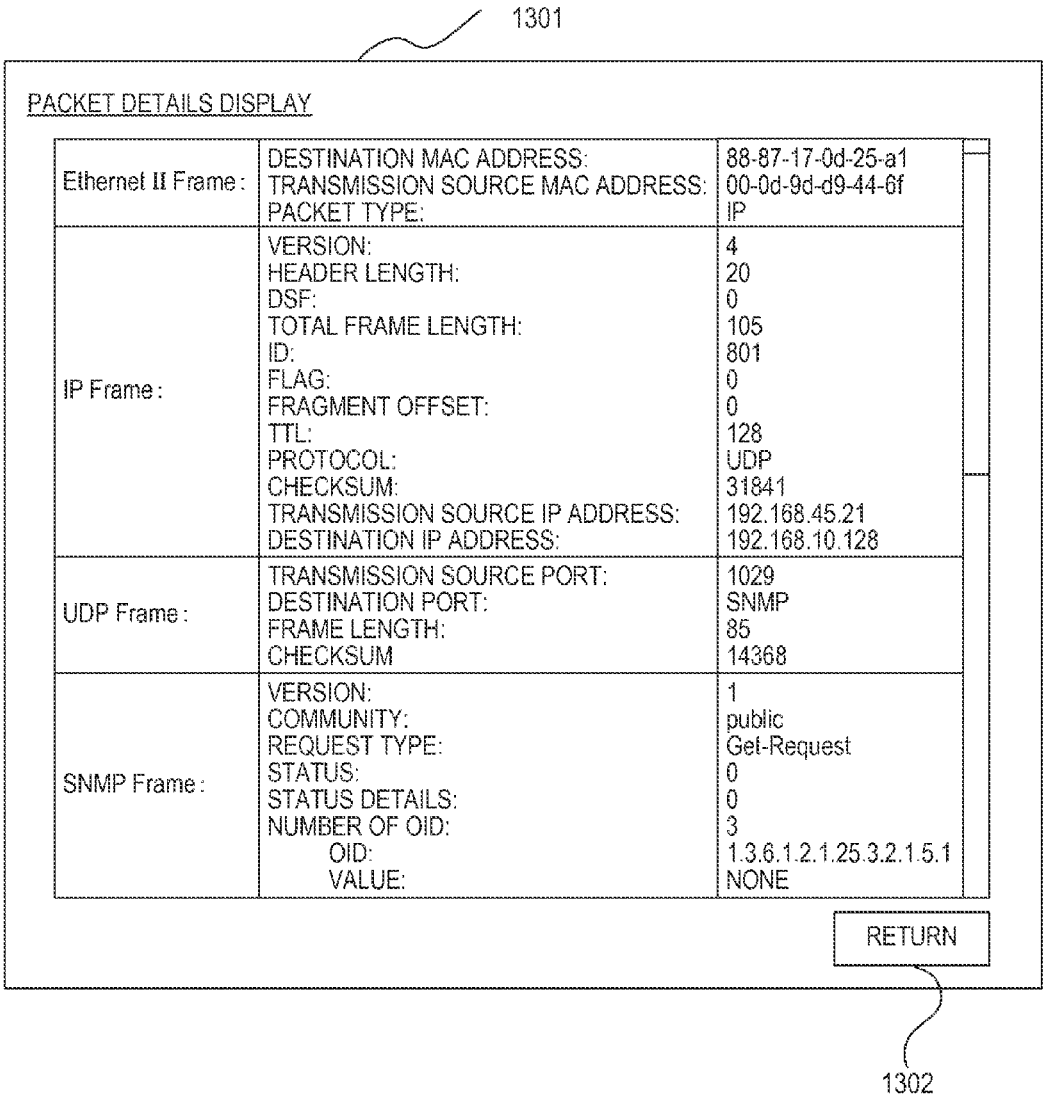

1201
1202
1203
1204
1205
LIST OF OBTAINED PACKETS
DATE
TRANSMISSION SOURCE
DESTINATION
PROTOCOL
7/22 09:16 192.168.10.12 192.168.10.128 SNMP
7/22 09:16 192.168.10.134 192.168.10.255 WSD
7/22 09:16 192.168.10.124 192.168.10.12 SNMP
7/22 09:17 192.168.10.21 192.168.10.255 ARP
7/22 09:17 192.168.10.124 192.168.10.21 ARP
7/22 09:17 192.168.45.21 192.168.10.255 SNMP
7/22 09:17 192.168.10.129 192.168.10.255 SLP
7/22 09:17 192.168.10.134 192.168.10.128 SLP
7/22 09:17 192.168.10.134 192.168.10.128 ICMP
7/22 09:17 192.168.13.130 192.168.10.128 HTTP
1213
1206
PACKET PROCESS IN POWER SAVING MODE
START OBTAINING PACKET
STOP OBTAINING PACKET
1207
DISCARD
WOL
RESPOND
DETAILS
RETURN
1212
1208
1209
1210
1211

FIG. 13


1301
PACKET DETAILS DISPLAY
Ethernet II Frame :
DESTINATION MAC ADDRESS:
TRANSMISSION SOURCE MAC ADDRESS:
PACKET TYPE:
88-87-17-0d-25-a1
00-0d-9d-d9-44-6f
IP
IP Frame :
VERSION:
HEADER LENGTH:
DSF:
TOTAL FRAME LENGTH:
ID:
FLAG:
FRAGMENT OFFSET:
TTL:
PROTOCOL:
CHECKSUM:
TRANSMISSION SOURCE IP ADDRESS:
DESTINATION IP ADDRESS:
4
20
0
105
801
0
0
128
UDP
31841
192.168.45.21
192.168.10.128
UDP Frame :
TRANSMISSION SOURCE PORT:
DESTINATION PORT:
FRAME LENGTH:
CHECKSUM
1029
SNMP
85
14368
SNMP Frame :
VERSION:
COMMUNITY:
REQUEST TYPE:
STATUS:
STATUS DETAILS:
NUMBER OF OID:
OID:
VALUE:
1
public
Get-Request
0
0
3
1.3.6.1.2.1.25.3.2.1.5.1
NONE
RETURN
1302

# DATA PROCESSING APPARATUS CAPABLE OF OPERATING IN POWER SAVING MODE, CONTROL METHOD OF DATA PROCESSING APPARATUS, AND STORAGE MEDIUM

## BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a data processing apparatus, an information processing method, and a program for achieving the information processing method.

2. Description of the Related Art

Conventionally, an information processing system capable of transitioning to a power saving state so as to reduce standby power consumption has been known. As an example of the information processing system like this, there is a system which consists of a controller (main controller) having a main CPU (central processing unit) and a network controller having a sub CPU.

In the power saving state, the system like this stands by in a condition that power supply to each module of the main controller is being stopped while normal power supply to each module of the network controller requiring less power is being maintained. Further, in a case where a predetermined packet is received from a network, the system like this still reduces power consumption by using a so-called substitute response technique in which the network controller responds to the packet reception while stopping the power supply to the main controller.

In the conventional substitute response technique, when the network controller is in the power saving state, the network controller determines whether or not each packet received by the network controller itself coincides with a data pattern of an ARP (Address Resolution Protocol) request packet to the network controller. Further, in the power saving state, the network controller determines whether or not each packet received by the network controller itself coincides with a data pattern of a packet (i.e., a wake-up packet) which should be processed by the main controller after returning the main controller from the power saving state.

Then, when it is determined that the received packet coincides with the data pattern of the ARP request packet, the network controller transmits transmission data stored in a transmission data register to a LAN (local area network) as an ARP response packet (that is, a substitute response is performed). On the other hand, when it is determined that the received packet coincides with the data pattern of the wake-up packet, the network controller returns the main controller from the power saving state by outputting a wake-up signal to the main controller. It should be noted that the substitute response technique like this has been described in Japanese Patent Application Laid-Open No. 2008-301077.

In recent years, applications, operating systems and the like for remotely managing various devices by using management protocols such as an SNMP (Simple Network Management Protocol) and the like tend to increase. For this reason, since there are many possibilities that various devices receive various kinds of packets for each operational environment of a customer's device, it is difficult to anticipate the packet flowing for each operational environment of the customer's device.

As a result, even if a data pattern to be used for a substitute response or a wake-up has been previously registered in a device, a situation of returning the device from a power saving state without performing the substitute response may occur according to a customer's operational environment, by the reason that the substitute response is impossible. Moreover, since unnecessary coincidence between a received packet and a previously registered unnecessary data pattern is drawn according to circumstances, a situation of unnecessarily returning a device from a power saving state may occur.



It is conceivable as one countermeasure to previously register every possible data patterns. However, since parts of devices each including a network controller capable of operating in a power saving state operates on resources of minimized number in terms of power saving, there are limitations to register all the data patterns for each of these devices.

Moreover, it is conceivable as another countermeasure to enable to change the data pattern according to a kind of packet flowing on a network by a user's operation of registering and setting the data pattern through an external interface of the device such as a USB (universal serial bus), a network, a user interface screen or the like. However, in this case, since an operator (a user, an administrator or the like) of the device has to register the data patterns, an operator's workload increases resultingly.

## SUMMARY OF THE INVENTION

The present invention has been completed in order to provide a technique for more easily maintaining a state of less power consumption.

To achieve such an object, the present invention provides a data processing apparatus comprising: a registering unit configured to register therein data for identifying a packet; a receiving unit configured to receive a packet transmitted through a network; a determining unit configured to, in a case where the receiving unit receives the packet while the data processing apparatus is operating in a power saving mode, determine whether or not to return the data processing apparatus from the power saving mode, on the basis of the data registered in the registering unit; an analyzing unit configured to perform an analysis process to the packet flowing on the network; a displaying unit configured to display a screen indicating a result of the analysis process by the analyzing unit; and an indicating unit configured to indicate the data to be registered in the registering unit, through the screen displayed by the displaying unit.

According to the present invention, it is possible to more easily maintain the state of less power consumption.

Moreover, the present invention may be achieved also by a method, a program, a system, a storage medium or the like.

Further features of the present invention will become apparent from the following description of exemplary embodiments with reference to the attached drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram illustrating an example of a network system.

FIG. **2** is a block diagram illustrating an example of a hardware constitution of a multifunction machine.

FIG. **3** is a block diagram illustrating an example of software (function part) of the multifunction machine.

FIG. **4** is a diagram illustrating an example of an SNMP (Simple Network Management Protocol) packet.

FIG. **5** is a diagram illustrating an example of a database table.

FIG. **6** is a flow chart indicating an example of a database table management process.

FIG. **7** is a diagram illustrating an example of pattern setting values.

FIG. **8** is a flow chart indicating an example of a pattern list generation process.

FIG. **9** is a diagram illustrating an example of a pattern list.

FIG. **10** is a flow chart indicating an example of a pattern information registration process.

FIG. **11** is a diagram illustrating an example of a user interface.

FIG. **12** is a diagram illustrating another example of the user interface.

FIG. **13** is a diagram illustrating a still another example of the user interface.

## DESCRIPTION OF THE EMBODIMENTS

Hereinafter, exemplary embodiments of the present invention will be described with reference to the attached drawings. Incidentally, it should be noted that all constitutions and configurations described in the following embodiments are not necessarily indispensable as means for solving the above problems.

### First Embodiment

The present embodiment relates to a technique for maintaining a power saving state in various apparatuses and devices. In the following, the present embodiment will be exemplarily described with reference to a multifunction machine **101** serving as an example of a data processing apparatus.

FIG. **1** is a block diagram illustrating an example of the constitution of a network system including the multifunction machine **101**. The multifunction machine **101** and a PC **102** are connected with each other through a network **103** and can be mutually communicated. Incidentally, it is not limited to the PC **102** to which the multifunction machine **101** is connected through the network **103**.

FIG. **2** is a block diagram illustrating an example of the hardware constitution of the multifunction machine **101**. The multifunction machine **101** has a main controller **210** and a network controller **230**. The main controller **210** is connected with the network **103** through the network controller **230**.

A main CPU **211** executes software programs of the main controller **210** and performs a control of the whole apparatus. A RAM **214**, which is a random access memory, is used for temporarily storing data when the main CPU **211** controls the apparatus. A ROM **213**, which is a read only memory, is used for storing a boot program of the apparatus, a fixed parameter and the like. An HDD **215**, which is a hard disk drive, is used for storing various data. An NVRAM **216**, which is a nonvolatile memory, stores various setting values of the main controller **210**. Incidentally, the RAM **214**, the HDD **215**, the NVRAM **216** or the like is an example of a storage unit.

An operation unit I/F (interface) **217** controls an operation unit **240**, makes a liquid crystal panel, which is an example of a display unit provided on the operation unit **240**, display various operation screens and transfers instructions input through the operation screens to the main CPU **211**. A scanner I/F **218** controls a scanner **250**. The scanner **250** generates image data by reading an image on an original. A printer I/F **219** controls a printer **260**. The printer **260** records an image based on the image data on a recording medium.

A USB I/F **220** controls a USB **270**. The USB **270** identifies a nonvolatile USB memory to be inserted from an exterior and identifies a file, a directory and the like by controlling a file system in the USB memory cooperating with the USB I/F **220**. An expansion I/F **212**, which is connected with an expansion I/F **232** of the network controller **230**, controls a data communication, which is performed with an external apparatus (PC **102** or the like) on the network **103**, through the network controller **230**.

A sub CPU **231** executes software programs of the network controller **230** and performs a control of the whole apparatus. A RAM **234**, which is a random access memory, is used for temporarily storing data when the sub CPU **231** controls the apparatus. In addition, matching data or the like used for identifying a packet received from the network **103** is held in the RAM **234**. A ROM **233**, which is a read only memory, is used for storing a boot program of the apparatus, a fixed parameter and the like.

The expansion I/F **232**, which is connected with the expansion I/F **212** of the main controller **210**, controls a data communication performed between the main controller **210** and the network controller **230**. A network I/F **235**, which is connected with the network **103**, controls a data communication performed between the multifunction machine **101** and an external apparatus (PC **102** or the like) on the network.

The main controller **210** operates by performing the switching between a normal power mode (an example of a first power mode) and a power saving mode (an example of a second power mode) of which the power consumption is less than that of the normal power mode. When transitioning to the power saving mode from the normal power mode, the power supply to the main CPU **211**, the HDD **215**, the NVRAM **216** and the like is stopped. On the other hand, the network controller **230** is operating with an ASIC (Application Specific Integrated Circuit), which is different from that in case of the main controller **210**, and the power supply is continued even when transitioning to the power saving mode.

FIG. **3** is a block diagram illustrating an example of the software (function part) constitution of the multifunction machine **101**. Each of blocks illustrated in FIG. **3** indicates a function which is realized by a process that the software (program) is executed by a built-in controller unit in the multifunction machine **101**.

A power saving control unit **307** performs a control concerned with the switching between the normal power mode and the power saving mode. An inter-CPU communication unit **305** performs the data transmission/reception with a function part of the network controller **230** through the expansion I/F **212** and the expansion I/F **232**.

An inter-CPU communication unit **304** performs the data transmission/reception with a function part of the main controller **210** through the expansion I/F **232** and the expansion I/F **212**. A network I/F control unit **303** controls the transmission/reception of a packet performed by the network I/F **235**.

Incidentally, the network I/F control unit **303** grasps a fact that the main controller **210** is operated with which the power mode either the normal power mode or the power saving mode. When the main controller **210** is operated with the normal power mode, the network I/F control unit **303** transfers packets to be received from the network **103** to the main controller **210**. When the main controller **210** is

operated with the power saving mode, the network I/F control unit **303** transfers the packets to be received from the network **103** to a substitute response processing unit **301**.

The substitute response processing unit **301** receives the packets transferred from the network I/F control unit **303** at the time of the power saving mode. Note that the substitute response processing unit **301** receives the packets in a case that the main controller **210** is operating with the power saving mode. When it is the normal power mode, the packets received by the network I/F control unit **303** are not transferred to the substitute response processing unit **301** but transferred to the main controller **210**.

The substitute response processing unit **301** classifies the packets, which were received at the time of the power saving mode, into three types of packets. More specifically, the substitute response processing unit **301** classifies the packets into "packet which should be discarded", "packet which should be transferred to the main controller **210**" and "packet which should perform a substitute response".

The "packet which should be discarded" is such a packet which can be ignored (it is not required to respond) in such a case, where the packet is not addressed to the own apparatus. The substitute response processing unit **301** discards the packet in a case that the received packet is classified into this type of packet.

The "packet which should be transferred to the main controller **210**" is such a packet characterized in that some process is required to be performed to the received packet but the required process is not able to be performed by only the network controller **230**. The substitute response processing unit **301** returns the main controller **210** from the power saving mode to the normal power mode in a case that the received packet is classified into this type of packet and transfers this packet to the main controller **210**.

The "packet to which a substitute response should be performed" is such a packet characterized in that the network controller **230** performs a response instead of the main controller **210**. The substitute response processing unit **301** generates a packet used for the response (a response packet) of this packet in a case that the received packet is classified into this type of packet and performs a response to a requesting source (a transmission source of the concerned packet) of this response packet on the network **103** through the network I/F control unit **303**.

A UI (User Interface) processing unit **308** receives a setting request, a processing request and the like to be input through the operation unit **240**, which is an example of an external interface, and then executes a necessary process every request. In addition, the UI processing unit **308** performs plural kinds of requests such as a request of asking to start and stop the acquisition of packets, a request of demanding the packets obtained by a packet sniffer **309** and other requests to the packet sniffer **309**. Note that more detailed contents will be described in the second embodiment.

When the main controller **210** is in the normal power mode, the packet sniffer **309** obtains packets which are flowing on the network **103** and stores the obtained packets into the HDD **215**. The packet sniffer **309** performs a corresponding process upon receiving a request from the UI processing unit **308**. Note that more detailed contents will be described in the second embodiment.

When the main controller **210** is in the normal power mode, an SNMP (Simple Network Management Protocol) processing unit **310** receives a packet of SNMP (SNMP packet) from the PC **102** and analyzes the received packet and then generates a response packet. The SNMP processing unit **310** can obtain various kinds of information, which the main controller **210** manages, and generates the response packet by using the obtained information (a response packet generation process).

In addition, after receiving a command from the UI processing unit **308**, the SNMP processing unit **310** manages the number of requesting the response packets, which is performed by the PC **102**, every the response packet from among the SNMP packets, to which the SNMP processing unit **310** itself performed the response packet generation process, transferred from the PC **102**. The SNMP processing unit **310** generates a pattern setting value based on the SNMP packet transferred from the PC **102** by preferentially treating the request, of which the requesting number is larger, and transfers the generated pattern setting value to a pattern generation unit **306**.

The pattern generation unit **306** generates a pattern list which includes data used for a process, which the substitute response processing unit **301** performs, by using the pattern setting value transferred from the SNMP processing unit **310**. In addition, the pattern generation unit **306** transfers the generated pattern list to a pattern management unit **302** via the inter-CPU communication unit **305** and the inter-CPU communication unit **304**. Furthermore, the pattern generation unit **306** stores the generated (transferred) pattern list into the HDD **215** and manages the pattern list. The pattern management unit **302** stores the pattern list into the RAM **234** and manages the pattern list. The pattern list is constituted by including pattern information which includes matching data and the like.

The substitute response processing unit **301** performs a pattern matching process to the packet received from a remote (PC **102** or the like) through the network I/F control unit **303** by using the pattern list obtained from the pattern management unit **302**. The substitute response processing unit **301** determines that a packet corresponds to which of the packet among the "packet which should be discarded", the "packet which should be transferred to the main controller **210**" and the "packet to which a substitute response should be performed" in the pattern matching process and then performs respective operations.

For example, when the "packet to which a substitute response should be performed" was determined, the substitute response processing unit **301** generates a response packet (response data) by using information in the received packet and data used for the substitute response included in pattern information (refer to FIG. **9**) corresponding to the concerned packet. The substitute response processing unit **301** transmits (responds) the generated response packet to a requesting source of the response packet while keeping the power saving mode.

FIG. **4** is a diagram illustrating an example of an SNMP packet, which the multifunction machine **101** received from the PC **102**. When the main controller **210** is in the normal power mode, the SNMP processing unit **310** analyzes the SNMP packet and performs various processes for the SNMP packets transferred from the PC **102**. In the SNMP, as illustrated in FIG. **4**, the packet is constituted by four large frames which are an Ethernet (registered trademark) frame, an IP frame, a UDP (User Datagram Protocol) frame and an SNMP frame.

When a pattern setting value is generated from the received SNMP packet, the SNMP processing unit **310** does not require information of each field in the frame of the SNMP packet, that is, information of all the regions in the packet. Information of a region required in generating the

pattern setting value is previously determined every network protocol, and information of the concerned region is used in a pattern matching process.

Hereinafter, it will be described by exemplifying information of a region required in case of generating the pattern setting value from the SNMP packet (properly called a packet).

A destination MAC (Media Access Control) address **401** denotes a MAC address of the destination of a packet. In the present example, since the PC **102** becomes to act as a transmission source and the destination becomes to be the multifunction machine **101**, a MAC address held by the multifunction machine **101** is included in this region. A destination port number **402** denotes a port number of the destination of SNMP. Generally, a value of a port number of the destination of SNMP is defined as "161" by the RFC (Request For Comment). Also in the present example, a value of the destination port number **402** is "161".

A Community **403** denotes a community name in the SNMP. Generally, in the SNMP, a process and a response are performed to a packet received from an apparatus of the same community, and a packet received from an apparatus of different community is discarded.

A Request type **404** denotes a Request type (GetRequest or the like) of the packet. An OID **405** and an OID **406** denote OIDs (Object IDs) in the SNMP. An apparatus which received an SNMP packet generally processes information corresponding to the OID in the received SNMP packet and performs a response.

The SNMP processing unit **310** receives the SNMP packet and creates a response packet and then performs a process, and, at the same time, the SNMP processing unit **310** generates a database table, which includes information of the destination MAC address **401**, the Request type **404**, the OID **405** and the OID **406** and then manages the database table. Note that more detailed contents will be described with reference to FIG. **5** and FIG. **6**. Meanwhile, the destination MAC address **401**, the destination port number **402**, the Community **403**, the Request type **404**, the OID **405** and the OID **406** are examples of prescribed items which were previously determined.

FIG. **5** is a diagram illustrating an example of a database table, which the SNMP processing unit **310** generates and manages. A packet type **501** denotes a type of the received packet. The type of packet mentioned here indicates either packet among unicast, broadcast and multicast. Generally, as to a fact of being either packet among the unicast, broadcast and multicast, it can be discriminated from a fact that values of the destination MAC address **401** are respectively different.

A Request type **502** denotes a type of Request (Request type) of the received packet. Generally, as the Request type of the SNMP, GetRequest, GetNext, SetRequest and the like are enumerated. Generally, GetNext is a method (Request) for obtaining a next OID for the OID requested by the GetRequest, and the processing content is the same as that of GetRequest. Therefore, the GetNext is treated as the same Request type as that of the GetRequest.

An OID **503** denotes an OID included in the received packet. An Index **504** denotes an index of the OID **503**. In the SNMP, generally, there is a case that an index, which is used for indicating the details of information, is assigned to setting information and management information which are assigned to the OID. As to a case of existing plural detailed information corresponding to the OID **503**, the Index **504** denotes an index of the plural detailed information. The number of times of Request **505** denotes the number of times (an example of number information) in receiving the same packet regarding the packet type **501**, the Request type **502** and the OID **503** (further Index **504** in a case existing the Index **504**).

FIG. **6** is a diagram indicating an example of a flow chart concerning a process of managing a database table (database table management process). The main CPU **211** (SNMP processing unit **310**) manages the database table as described below.

The main CPU **211** receives a packet from the PC **102** through the expansion I/F **212** or the like (Step S**600**). The main CPU **211** confirms (checks) whether or not a community name of the Community **403** of the received packet is identical with a community name held in the NVRAM **216** or the like in a step S**601**. When it was judged that the community names are not identical with each other, the main CPU **211** terminates a process to the database table for the received packet. On the other hand, when it was judged that the community names are identical with each other, the main CPU **211** advances a process to a step S**602**.

In the step S**602**, the main CPU **211** confirms that a type of the concerned packet is what type of a packet among the unicast, broadcast and multicast with reference to the destination MAC address **401** of the received packet.

In a step S**603**, the main CPU **211** confirms the Request type of the concerned packet with reference to the Request type **404** of the received packet. In a step S**604**, the main CPU **211** confirms whether or not an unchecked OID exists from one or plural OIDs (OID **405**, OID **406** and the like) included in the received packet. When it was judged that the unchecked OID exists, the main CPU **211** advances a process to a step S**605**. On the other hand, when it was judged that the unchecked OID does not exist, the main CPU **211** terminates a process to the database table for the received packet by treating that checks for all the OIDs are completed.

In the step S**605**, the main CPU **211** confirms whether or not an Index of the OID targeted to be performed a check exists in the packet. When it was judged that the Index exists, the main CPU **211** advances a process to a step S**607**. On the other hand, when it was judged that the Index does not exist, the main CPU **211** advances the process to a step S**606**.

In a step S**607**, the main CPU **211** confirms whether or not a record of the same confirmed packet type, Request type, OID and Index exists in the database table. When it was judged that a record of the same information exists, the main CPU **211** advances a process to a step S**609**. On the other hand, when it was judged that a record of the same information does not exist, the main CPU **211** advances a process to a step S**608**. In the step S**609**, the main CPU **211** increments the number of times of Request **505** in the record of the same information and advances a process to the step S**604**.

In the step S**608**, the main CPU **211** confirms whether or not a substitute response can be performed to information, which corresponds to the OID (OID and Index when Index exists) targeted to be performed a check, by the network controller **230** in a state of the power saving mode. When it was judged that the substitute response can be performed, the main CPU **211** advances a process to a step S**610**. On the other hand, when it was judged that the substitute response cannot be performed, the main CPU **211** advances a process to the step S**604**.

Here, it will be described about information which is currently managed by the main controller **210**. Information which is dynamically updated by using the main controller

210 and information which is changing in real time such as various setting values used for operating the main controller itself, residual quantity of sheets and the like are included in the information which is currently managed by the main controller **210**. In addition, information such as specification, a consumption degree, condition, error and the like which can be obtained from parts such as the printer **260**, the scanner **250** and the like are also included in the information which is currently managed by the main controller **210**.

In case of receiving a packet which prompts to return from the power saving mode or in a case that information at a time when the packet was received is required to return to the PC **102**, it is required to return to the normal power mode from the power saving mode and execute a process to the packet received by the SNMP processing unit **310**. Therefore, in the present embodiment, the main CPU **211** confirms whether or not a substitute response can be performed to information (a fixed setting value or the like), to which, for example, the substitute response can be performed, with reference to the NVRAM **216**, in which identifiable information (OID, OID and Index thereof or the like) is previously stored.

Here, the database table is used for maintaining the power saving mode for a longer period under the network environment where the multifunction machine **101** is located. Therefore, the main CPU **211** does not perform management at the database table to a packet which is in a case that "it is indispensable to be returned from the power saving mode". As to a pattern setting value to be generated, it will be described with reference to FIG. **7**.

In the step S**610**, the SNMP processing unit **310** adds information of the confirmed packet type, Request type, OID and Index to the database table as a record and sets a value "1" for the number of times of Request **505**.

In the step S**606**, the main CPU **211** confirms whether or not a record of the same confirmed packet type, Request type and OID exists in the database table. When it was judged that a record of the same information exists, the main CPU **211** advances a process to the step S**609**. On the other hand, when it was judged that a record of the same information does not exist, the main CPU **211** advances a process to the step S**608**.

FIG. **7** is a diagram illustrating an example of pattern setting values. The pattern setting values are constituted by including matching data (an example of identification information) used for identifying the received packet and processing data (an example of processing information) which defined that what process should be performed in a case that the received packet coincided with the matching data. Incidentally, in a matching process, pattern information matches with the concerned packet is specified on the basis of data in the received packet and the matching data.

The SNMP processing unit **310** generates the pattern setting values before the main controller **210** transitions to the power saving mode and transmits the values to the pattern generation unit **306**. The SNMP processing unit **310** uses the database table generated and managed in the process in a flow chart illustrated in FIG. **6** and generates the pattern setting values preferentially selecting from a record of which the number of times of Request **505** is the largest number. For example, in a case that information of OID can be included in the pattern setting values up to a specified value (for example, ten pieces) according to the restriction of capacity, the SNMP processing unit **310** performs to include information of ten pieces of higher ranks OIDs, of which the number of times of Request **505** is larger number, into the pattern setting values.

Destination port number information **701** denotes a value of the destination port number **402** of the packet which was received at a time of the power saving mode. The value of the destination port number **402**, which is a previously defined value as mentioned above, is stored in the HDD **215**, the NVRAM **216** or the like. The SNMP processing unit **310** sets the value (previously defined value) of the destination port number **402** to the destination port number information **701**. The destination port number information **701** is formed into pattern information through the pattern generation unit **306** to be transferred to the substitute response processing unit **301**. Accordingly, in the power saving mode, the substitute response processing unit **301** compares a destination port number of the received packet with a destination port number of certain pattern information and can judge whether or not the concerned packet matches with that pattern information.

Protocol name information **702** denotes a protocol name of the packet which was received at a time of the power saving mode. Generally, as to a network protocol, a protocol, which is corresponded by the destination port number information **701**, can be determined. Therefore, if either information among the destination port number information **701** and the protocol name information **702** is set, it may be regarded that the setting value is an effective value.

Packet type information **703** denotes a packet type of the received packet. The SNMP processing unit **310** sets a value of the packet type **501** to the packet type information **703**.

Pattern setting enabled/disabled information **704** denotes the enabled/disabled of pattern setting values. In a case that information indicating effectiveness of the pattern setting value is set to the pattern information on the basis of the pattern setting enabled/disabled information **704**, the substitute response processing unit **301** is to perform a matching process of that pattern information to the packet which was received at a time of the power saving mode. In a case that information indicating ineffectiveness of the pattern setting value is set to the pattern information on the basis of the pattern setting enabled/disabled information **704**, the substitute response processing unit **301** does not perform the matching process of that pattern information to the packet which was received at a time of the power saving mode.

As to the pattern setting enabled/disabled information **704**, the SNMP processing unit **310** basically sets it to the pattern information by treating it as effective information (information "1" indicating effectiveness).

Operation type information **705**, which is an example of processing information, indicates a type of a subsequent operation in a case that the received packet matched with the pattern information. Information (for example, "1") indicating "discard a reception packet" can be set to the operation type information **705**. Also, information (for example, "2") indicating "transfer a reception packet to the main controller **210** and return from the power saving mode" can be set to the operation type information **705**. Also, information (for example, "0") indicating "perform a process of response of a packet received by the network controller **230** and transmit the processed response on behalf of the main controller **210** while maintaining the power saving mode" can be set to the operation type information **705**.

In the present embodiment, a record of the packet, to which the substitute response can be performed in a process indicated in FIG. **6**, is stored, and a pattern setting value characterized in that "0" indicating the substitute response was set to the operation type information **705** is generated on the basis of that record. Then, when that pattern setting value is formed into pattern information through the pattern gen-

eration unit **306**, since the substitute response is to be performed, the power saving mode is to be maintained for a longer period.

Pattern setting value updatable/non-updatable information **706** indicates the updatable/non-updatable (update is permitted or not) of the pattern information generated based on the pattern setting value. The pattern setting value updatable/non-updatable information **706** becomes to be required in a case that amount of the pattern information held by the network controller **230** became the maximum on the resource of the network controller **230**. As to the pattern setting value updatable/non-updatable information **706**, in a case that amount of the pattern information held by the network controller **230** becomes the maximum, the pattern setting value updatable/non-updatable information **706** of the registered pattern information, which is in a state of "overwritable", is used for overwriting with new pattern information subsequently.

In addition, as to the pattern setting value updatable/non-updatable information **706**, it is possible to set to delete the pattern information. By setting a process of deletion, it is possible to delete and disable the pattern information which was unable to be overwritten formerly. In the present embodiment, the SNMP processing unit **310** sets "0" indicating prohibition of the update to the pattern setting value updatable/non-updatable information **706**.

Request type information **707** denotes a Request type (GetRequest or the like) of the received packet. The SNMP processing unit **310** sets a value of the Request type **502** to the Request type information **707**. The Request type information **707** is formed into the pattern information through the pattern generation unit **306** to be transferred to the substitute response processing unit **301**. Accordingly, in the power saving mode, the substitute response processing unit **301** compares a Request type of the received packet with a Request type of certain pattern information and can judge whether or not the concerned packet matches with that pattern information.

Community information **708** denotes a Community name of the received packet. The SNMP processing unit **310** sets a value of the Community **403** (Community name held in the HDD **215**, the NVRAM **216** or the like) to the Community information **708**. The Community information **708** is formed into the pattern information through the pattern generation unit **306** to be transferred to the substitute response processing unit **301**. Accordingly, in the power saving mode, the substitute response processing unit **301** compares a Community name of the received packet with a Community name of certain pattern information and can judge whether or not the concerned packet matches with that pattern information.

OID information **709** denotes an OID of the received packet. The SNMP processing unit **310** sets a value of the OID **503** to the OID information **709**. Correspondence information **710** denotes information which corresponds to the OID information **709**. Index information **711** denotes information which corresponds to an Index value of the OID. The SNMP processing unit **310** sets a value of the Index **504** to the Index information **711**.

Information, which corresponds to the OID (or OID and Index), is included in the correspondence information **710** and the Index information **711** among various kinds of information currently managed by the main controller **210**. Incidentally, information which is dynamically updated by using the main controller **210** such as various setting values used for operating the main controller itself, residual quantity of sheets and the like are included in the various kinds of information currently managed by the main controller **210**. In addition, information such as specification, a consumption degree, condition, error and the like which can be obtained from parts such as the printer **260**, the scanner **250** and the like are also included in the information which is currently managed by the main controller **210**.

The OID information **709** and the correspondence information **710** are formed into pattern information through the pattern generation unit **306** to be transferred to the substitute response processing unit **301**. In the power saving mode, the substitute response processing unit **301** compares an OID of the received packet with an OID of certain pattern information and can judge whether or not the concerned packet matches with that pattern information. In addition, an OID and the Index information **711** of this OID are formed into pattern information through the pattern generation unit **306** to be transferred to the substitute response processing unit **301**. In the saving mode, the substitute response processing unit **301** compares the OID and Index of the received packet with the OID and Index of certain pattern information and can judge whether or not the concerned packet matches with that pattern information.

As mentioned above, the SNMP processing unit **310** generates pattern setting values and transfers the generated values to the pattern generation unit **306**. Incidentally, the destination port number information **701** (protocol name information **702**), the packet type information **703**, the Request type information **707** and the Community information **708** are examples of identification information for identifying the type of packets. In addition, the pattern setting value is an example of setting information formed by associating processing information with identification information.

FIG. **8** is a diagram indicating an example of a flow chart related to a process (pattern list generation process), which the pattern generation unit **306** performs in a case that the SNMP processing unit **310** generated pattern setting values as indicated in FIG. **7** and transferred the generated values to the pattern generation unit **306**.

In a step S**801**, the main CPU **211** generates the pattern setting values on the basis of a database table. In a step S**802**, the main CPU **211** analyzes the pattern setting values and generates a pattern list (refer to FIG. **9**). In a step S**803**, the main CPU **211** transfers the generated pattern list to the network controller **230** by a method of inter-CPU communication.

FIG. **9** is a diagram illustrating an example of a pattern list (pattern information **901**) generated by the pattern generation unit **306**. The pattern information **901** is an example of a pattern list, which the pattern generation unit **306** generates on the basis of the pattern setting values indicated in FIG. **7**. Incidentally, the pattern list (pattern information) is an example of the setting information formed by associating processing information with identification information.

FIG. **10** is a diagram indicating an example of a flow chart related to a process (pattern information registration process), which the network controller **230** performs in a case that the pattern list was transferred to the network controller **230** by a process in the step S**803**.

In a step S**1001**, the sub CPU **231** receives an inter-CPU message (a pattern list or the like transferred from the network controller **230** in the step S**803**) by a method of inter-CPU communication. In a step S**1002**, the sub CPU **231** confirms whether or not the received inter-CPU message is a message of registering the pattern list (registration request). When it was judged that it was not the registration request, the sub CPU **231** terminates a process. On the other

hand, when it was judged that it was the registration request, the sub CPU **231** advances the process to a step **S1003**.

In the step **S1003**, the sub CPU **231** obtains a pattern list from the inter-CPU message received in the step **S1001**. In a step **S1004**, the sub CPU **231** obtains one of the pattern information from the pattern list and confirms whether or not pattern information, which coincides with the obtained one information, exists in the pattern list held in the RAM **234**.

Here, as to a fact of coinciding or not coinciding with the obtained one information, it is judged based on information of, for example, a destination port number (and/or protocol name) of the pattern information, packet type, Request, scope and type (type and Index when Index exists).

When it was judged that pattern information, which coincides with the obtained one information, does not exist, the sub CPU **231** advances a process to a step **S1006**. On the other hand, when it was judged that pattern information, which coincides with the obtained one information, exists, the sub CPU **231** advances the process to a step **S1005**.

In a step **S1005**, the sub CPU **231** checks whether or not the pattern setting value updatable/non-updatable information of the coincided pattern information in the pattern list held in the RAM **234** can be updated. That is, it is checked whether an attribute of the "pattern setting value updatable/non-updatable" is "1" or "0". When it was judged that it is non-updatable (that is, attribute of the "pattern setting value updatable/non-updatable" is "0"), the sub CPU **231** advances a process to a step **S1007**. On the other hand, when it was judged that it is updatable (that is, attribute of the "pattern setting value updatable/non-updatable" is "1"), the sub CPU **231** advances the process to the step **S1006**.

In the step **S1006**, the sub CPU **231** registers one of the pattern information, which was obtained in the step **S1004**, to the pattern list held in the RAM **234**. In case of performing the overwriting registration, it is performed to the coincided pattern information.

In the step **S1007**, the sub CPU **231** confirms whether or not pattern information (unprocessed pattern information) other than the pattern information obtained in the step **S1004** exists in the pattern list obtained in the step **S1003**. When it was judged that the unprocessed pattern information exists, the sub CPU **231** repeats processes subsequent to the step **S1004** to the unprocessed pattern information. On the other hand, when it was judged that the unprocessed pattern information does not exist, the sub CPU **231** advances the process to a step **S1008**. In the step **S1008**, the sub CPU **231** transfers the registered result of the pattern information (pattern list) to the main controller **210** by a method of inter-CPU communication.

According to the above-mentioned process, when the main controller **210** received a packet from the PC **102** in the power saving mode, the substitute response processing unit **301** specifies the pattern information by executing a pattern matching process by use of the pattern list, and it becomes possible to confirm whether or not the substitute response can be performed. In a case that the substitute response can be performed, the substitute response processing unit **301** generates a response packet of the received packet by using the pattern information and performs a response to the PC **102**. In a case that the substitute response cannot be performed, the substitute response processing unit **301** discards the received packet or returns the main controller **210** from the power saving mode and transfers the packet to the main controller **210**. As to determination which the process should be performed among these processes, it is determined based on a value of the operation type of the pattern information.

FIG. **11** is a diagram illustrating an example (a setting screen **1101**, which is displayed on the operation unit **240**, for setting a type of network protocol of performing a substitute response in the power saving mode) of a user interface. The setting screen **1101** has such the constitution, where it is selected that the substitute response should be performed when the packet is for what kind of the network protocol in a case that the packet was received from the PC **102** when the main controller **210** is in the power saving mode.

When the SNMP is selected on the setting screen **1101**, the UI processing unit **308** requests to generate a pattern setting value (generation request) of the substitute response to the SNMP processing unit **310**. When the generation request of the pattern setting value is received, the SNMP processing unit **310** generates a database table by the above-mentioned method and manages the table and then generates the pattern setting value. Then, the SNMP processing unit **310** transfers the pattern list (pattern information) to the network controller **230** through the pattern generation unit **306** before the main controller **210** transitions to the power saving mode.

In the present embodiment, although it has been described exemplifying the SNMP, it is possible to provide the mechanism of performing the substitute response to a packet of the protocol such as a SLP Service Location Protocol), a WSD or the like by the similar method. In addition, plural network protocols can be simultaneously selected on the setting screen **1101**.

According to the above-mentioned constitution, the load of registration operation of the pattern information performed by an operator can be reduced.

## Second Embodiment

In the present embodiment, as a registration method of the pattern information different from that of the first embodiment, a method that the packets received by the packet sniffer **309** from the network **103** are stored into the HDD **215** and the stored packets are utilized in registering the pattern information will be described. In the present embodiment, as to the same constitution as that of the first embodiment, the description thereof will be properly omitted.

FIG. **12** is a diagram illustrating an example (a list screen of obtained packets **1201** for displaying a list of packets received by the multifunction machine **101** from the network **103** on the operation unit **240**) of a user interface. In the list screen of obtained packets **1201**, the obtained packets are displayed in a list format. More specifically, the UI processing unit **308** obtains the packets, which were obtained by the packet sniffer **309**, from the HDD **215** and displays the packets on the list screen of obtained packets **1201**.

In the list screen of obtained packets **1201**, cells of the respective packets can be selected by an operator, and individual processing to the selected packet is performed by depressing a button on the screen. A Date **1202** denotes dates and times when the packet sniffer **309** obtained packets. A transmission source **1203** denotes IP addresses of transmission sources of the packets received by the packet sniffer **309**.

A destination **1204** denotes IP addresses of destinations of the packets received by the packet sniffer **309**. In a list of the packets to be displayed on the list screen of obtained packets **1201**, for example, a packet filtering process is performed by the packet sniffer **309** when the packet sniffer **309** obtains the packets, and packets filtered and narrowed down are displayed. The packet filtering process is such a process of

not obtaining all the packets which are flowing on the network **103** but selectively obtaining the packets matching with a specific condition.

An object of obtaining the packet in this case is to perform a registration of the pattern information for the packets received by the multifunction machine **101**. Therefore, the packet sniffer **309** does not obtain all the packets which are flowing on the network **103** but obtains the packets to be received by the multifunction machine **101** by using the packet filtering process and makes not to obtain packets other than the above-mentioned packets. As the packets to be received by the multifunction machine **101**, for example, a packet of which the destination **1204** is an IP address held by the multifunction machine **101** and a broadcast packet or a multicast packet to be transferred from the transmission source.

A protocol **1205** denotes a protocol (for example, protocol name) of the packet received by the packet sniffer **309**. A packet obtaining start button **1206** is a button used for starting to obtain the packets. When the packet obtaining start button **1206** is depressed, the UI processing unit **308** performs a request of starting to obtain packets to the packet sniffer **309**. The packet sniffer **309** obtains packets on the network **103** upon receiving the starting request from the UI processing unit **308** while performing the packet filtering process and stores the obtained packets into the HDD **215** at all times. A packet obtaining stop button **1207** is a button used for stopping to obtain the packets. When the packet obtaining stop button **1207** is depressed, the UI processing unit **308** performs a request of stopping to obtain packets to the packet sniffer **309**. The packet sniffer **309** terminates to obtain packets upon receiving the stopping request from the UI processing unit **308** and notifies the termination to the UI processing unit **308**.

The UI processing unit **308** obtains the packets, which the packet sniffer **309** stored into the HDD **215**, upon receiving a termination notification from the packet sniffer **309** and displays the obtained packets as a list on the list screen of obtained packets **1201**. In addition, the UI processing unit **308** performs a selection request of a packet, which becomes a main cause of returning from the power saving mode, to the pattern generation unit **306** together with the packets held in the RAM **214**.

When the selection request is received, the pattern generation unit **306** selects a packet which becomes a main cause of returning from the power saving mode on the basis of the received packets and the pattern list which is currently managed and notifies the selected result (for example, information which can identify packets) to the UI processing unit **308**. The UI processing unit **308** performs a color inversion process (color inversion display) to the notified packet among the packets displayed on the list screen of obtained packets **1201**. Herewith, it become possible to specify the packet which returns from the power saving mode and display the specified packet simply for an operator in a pattern matching process using the pattern information which is currently registered.

Here, the pattern generation unit **306** receives pattern setting values from a processing unit such as the SNMP processing unit **310** or the like and generates a pattern list. For example, the SNMP processing unit **310** automatically generates a pattern setting value, which aimed to return from the power saving mode, in accordance with previously determined information when the multifunction machine **101** is activated and transmits the generated pattern setting value to the pattern generation unit **306**. Therefore, the pattern generation unit **306** can select a packet which becomes a main cause of returning from the power saving mode among the transferred packets by using the pattern list currently managed.

A discard button **1208** is a button used for discarding the packet of selected type in a case that the network controller **230** received the packet of which type is selected by an operator on the list screen of obtained packets **1201**. As to an operation in a case that the discard button **1208** was depressed, it will be described by exemplifying an SNMP packet **1213**. When the SNMP packet **1213** is selected by an operator and the discard button **1208** is depressed, the UI processing unit **308** transmits the selected SNMP packet **1213** to the SNMP processing unit **310** by treating it as a packet discard pattern registration request. The SNMP processing unit **310** receives the packet discard pattern registration request and generates the pattern setting values as described in FIG. **7**.

Here, as described with reference to FIG. **4**, information of a region necessary for registering the pattern information is previously determined every the network protocol, and information of the necessary region is to be targeted for a pattern matching process. Therefore, the SNMP processing unit **310** can generate a pattern setting value used for discarding the packet by using the information of the region necessary for registering the pattern information from the packets received from the UI processing unit **308**.

The SNMP processing unit **310** transmits the generated pattern setting value to the pattern generation unit **306**. The pattern generation unit **306** performs a process by using the pattern setting value transferred from the SNMP processing unit **310** in accordance with a flow chart indicated in FIG. **8**.

A WOL (Wake on LAN) button **1209** is a button used for setting to return from the power saving mode in a case that the network controller **230** received the packet of which the type is selected by an operator on the list screen of obtained packets **1201**. As to an operation in a case that the WOL button **1209** was depressed, it will be described by exemplifying the SNMP packet **1213**.

When the SNMP packet **1213** is selected by an operator and the WOL button **1209** is depressed, the UI processing unit **308** transmits the selected SNMP packet **1213** to the SNMP processing unit **310** by treating it as a normal power mode returning pattern registration request. The SNMP processing unit **310** receives the normal power mode returning pattern registration request and generates the pattern setting values as described in FIG. **7**.

Here, as described with reference to FIG. **4**, information of a region necessary for registering the pattern information is previously determined every the network protocol, and information of the necessary region is to be targeted for a pattern matching process. Therefore, the SNMP processing unit **310** can generate a pattern setting value used for returning from the power saving mode by using the information of the region necessary for registering the pattern information from the packets received from the UI processing unit **308**.

The SNMP processing unit **310** transmits the generated pattern setting value to the pattern generation unit **306**. The pattern generation unit **306** performs a process by using the pattern setting value transferred from the SNMP processing unit **310** in accordance with a flow chart indicated in FIG. **8**.

A response button **1210** is a button used for performing a substitute response without returning from the power saving mode in a case that the network controller **230** received the packet of which the type is selected by an operator on the list screen of obtained packets **1201**. As to an operation in a case

that the response button **1210** was depressed, it will be described by exemplifying the SNMP packet **1213**.

When the SNMP packet **1213** is selected by an operator and the response button **1210** is depressed, the UI processing unit **308** transmits the selected SNMP packet **1213** to the SNMP processing unit **310** by treating it as a substitute response pattern registration request. The SNMP processing unit **310** receives the substitute response pattern registration request and generates the pattern setting values as described in FIG. **7**.

Here, as described with reference to FIG. **4**, information of a region necessary for registering the pattern information is previously determined every the network protocol, and information of the necessary region is to be targeted for a pattern matching process. Therefore, the SNMP processing unit **310** can generate a pattern setting value used for performing the substitute response by using the information of the region necessary for registering the pattern information from the packets received from the UI processing unit **308**.

The SNMP processing unit **310** transmits the generated pattern setting value to the pattern generation unit **306**. The pattern generation unit **306** performs a process by using the pattern setting value transferred from the SNMP processing unit **310** in accordance with a flow chart indicated in FIG. **8**.

A details button **1211** is a button used for displaying a screen (refer to FIG. **13**) which displays the details of the packet selected by an operator on the list screen of obtained packets **1201**. When the details button **1211** is depressed for the selected packet on the list screen of obtained packets **1201**, the UI processing unit **308** displays the details of actual data of the packet, which is selected, on the operation unit **240**.

A return button **1212** is a button used for terminating the list screen of obtained packets **1201**. When the return button **1212** is depressed, the UI processing unit **308** terminates the list screen of obtained packets **1201** on the operation unit **240** and discards data of the packet which was obtained from the HDD **215** and held.

FIG. **13** is a diagram illustrating an example (a packet details display screen **1301** to be displayed when the details button **1211** is depressed) of a user interface. When the details button **1211** is depressed for the packet which was selected on the list screen of obtained packets **1201**, the UI processing unit **308** displays details of actual data of the packet, which is selected, on the operation unit **240** with a state of classifying the contents every field of each of frames in the packet.

A return button **1302** is a button used for terminating the packet details display screen **1301**. When the return button **1302** is depressed, the UI processing unit **308** terminates the packet details display screen **1301** on the operation unit **240** and displays the list screen of obtained packets **1201**.

By providing the user interface as mentioned above to an operator, a packet which becomes a main cause of returning from the power saving mode can be specified to a packet which is flowing every network environment, where the multifunction machine **101** is located, of a customer. In addition, a packet of main cause of the returning is specified to an operator and a mechanism capable of registering such pattern information which can maintain the power saving mode for a longer period is provided to an operator.

According to the above-mentioned constitution, an operator of apparatus becomes to be able to register the pattern information after actually recognizing that what kind of the contents is held in the packet flowing on the network **103**. In addition, even if the operator of apparatus does not set or edit detailed data of the packet flowing on the network, pattern information such as a substitute response, a wakeup or the like becomes to be able to register or change in accordance with a network environment every customer.

In this manner, the returning to an unnecessary normal power mode at a time of the power saving mode can be suitably and simply avoided, and, as a result, it becomes possible to maintain the power saving mode for a longer period.

Incidentally, the present embodiment is not limited to the above-mentioned constitution. For example, in the list screen of obtained packets **1201**, although an example of displaying the obtained packets in time series has been enumerated, it may be constituted that the obtained packets are displayed in statistical order (large amount order or the like). According to this constitution, an operator of apparatus can simply set packets, which are frequently received, to use a substitute response.

## Other Embodiments

It should be noted that the embodiments of the present invention are not limited to those described above. More specifically, the constitutions of the first and second embodiments may be properly combined.

Moreover, the present invention can also be achieved by a process that software (programs) for achieving the functions of the above embodiments is supplied to a system or apparatus through a network or various storage media and the supplied programs are read and executed by a computer (a CPU (central processing unit), an MPU (micro processing unit) or the like) of the system or apparatus.

Incidentally, it should be noted that the above main controller **210** serves as a first information processing apparatus (an example of a first computer) and the above network controller **230** serves as a second information processing apparatus (an example of a second computer).

According to the above embodiments, it is possible to easily maintain the state of less power consumption.

While the present invention has been described with reference to what are presently considered to be the preferred embodiments, it is to be understood that the invention is not limited to the disclosed embodiments. On the contrary, the invention is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims.

The embodiments of the present invention can also be realized by a computer of a system or apparatus that reads out and executes computer executable instructions recorded on a storage medium (e.g., non-transitory computer-readable storage medium) to perform the functions of one or more of the above embodiments of the present invention, and by a method performed by the computer of the system or apparatus by, for example, reading out and executing the computer executable instructions from the storage medium to perform the functions of one or more of the above embodiments. The computer may comprise one or more of a CPU, an MPU, or other circuitry, and may include a network of separate computers or separate computer processors. The computer executable instructions may be provided to the computer, for example, from a network or the storage medium. The storage medium may include, for example, one or more of a hard disk, a RAM (random-access memory), a ROM (read only memory), a storage of distributed computing systems, an optical disk (such as a CD (compact disc), a DVD (digital versatile disc), or a Blu-ray Disc (BD)™), a flash memory device, a memory card, and the like.

While the present invention has been described with reference to the exemplary embodiments, it is to be understood that the invention is not limited to the disclosed exemplary embodiments. The scope of the following claims is to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures and functions.

This application claims the benefit of Japanese Patent Application No. 2012-144548, filed Jun. 27, 2012, which is hereby incorporated by reference herein in its entirety.

What is claimed is:

**1**. A data processing apparatus which can operate in a power saving mode in which power consumption is smaller than that of a normal power mode, the apparatus comprising:

one or more processors; and

one or more memories storing instructions that, when executed by the one or more processors, cause the one or more processors to:

store, in the one or more memories, a response pattern indicating one or more packets the data processing apparatus can respond to while maintaining the power saving mode, a return pattern indicating one or more packets for returning the data processing apparatus from the power saving mode to the normal power mode, and a discard pattern indicating one or more packets that the data processing apparatus discards;

when a packet corresponding to the response pattern stored in the one or more memories is received by the data processing apparatus operating in the power saving mode, respond to the received packet while maintaining the power saving mode;

when a packet corresponding to the return pattern stored in the one or more memories is received by the data processing apparatus operating in the power saving mode, return the data processing apparatus from the power saving mode to the normal power mode;

when a packet corresponding to the discard pattern stored in the one or more memories is received by the data processing apparatus operating in the power saving mode, discard the received packet while maintaining the power saving mode;

cause a packet information screen showing the packet received by the data processing apparatus to be displayed; and

register a packet in the one or more memories as any of the response pattern, the return pattern, or the discard pattern after the packet is selected by a user from the packet information screen.

**2**. The data processing apparatus according to claim **1**, wherein at least a packet reception date and hour and a packet transmission source address are displayed on the packet information screen.

**3**. The data processing apparatus according to claim **1**, wherein, on the packet information screen, a first object for registering the packet selected by the user in the one or more memories as the response pattern and a second object for registering the packet selected by the user in the one or more memories as the return pattern are displayed.

**4**. The data processing apparatus according to claim **1**, wherein, on the packet information screen, a first object for registering the packet selected by the user in the one or more memories as the response pattern, a second object for registering the packet selected by the user in the one or more memories as the return pattern, and a third object for registering the packet selected by the user in the one or more memories as the discard pattern are displayed.

**5**. The data processing apparatus according to claim **1**, wherein the instructions, when executed by the one or more processors, further cause the one or more processors to:

obtain a packet,

wherein obtaining the packet starts in response to reception of an obtaining start instruction from the user, and obtaining the packet stops in response to reception of an obtaining stop instruction from the user; and

cause the packet obtained by the sniffer unit to be displayed on the packet information screen.

**6**. The data processing apparatus according to claim **1**, wherein the data processing apparatus further includes a printing apparatus.

**7**. A control method of a data processing apparatus which can operate in a power saving mode of which power consumption is smaller than that of a normal power mode, the method comprising:

storing, in a memory, a response pattern indicating one or more packets the data processing apparatus can respond to while maintaining the power saving mode, a return pattern indicating one or more packets for returning the data processing apparatus from the power saving mode to the normal power mode, and a discard pattern indicating one or more packets that the data processing apparatus discards;

when a packet corresponding to the response pattern stored in the memory is received by the data processing apparatus operating in the power saving mode, responding to the received packet while maintaining the power saving mode;

when a packet corresponding to the return pattern stored in the memory is received by the data processing apparatus operating in the power saving mode, returning the data processing apparatus from the power saving mode to the normal power mode;

when a packet corresponding to the discard pattern stored in the memory is received by the data processing apparatus operating in the power saving mode, discarding the received packet while maintaining the power saving mode;

causing a packet information screen showing the packet received by the data processing apparatus to be displayed; and

registering a packet in the memory as any of the response pattern, the return pattern, or the discard pattern after the packet is selected by a user from the packet information screen.

**8**. A non-transitory computer-readable storage medium storing a computer-executable program that, when executed by a processor, causes the processor to implement a control method of a data processing apparatus which can operate in a power saving mode of which power consumption is smaller than that of a normal power mode, the control method comprising:

storing, in a memory, a response pattern indicating one or more packets the data processing apparatus can respond to while maintaining the power saving mode, a return pattern indicating one or more packets for returning the data processing apparatus from the power saving mode to the normal power mode, and a discard pattern indicating one or more packets that the data processing apparatus discards;

when a packet corresponding to the response pattern stored in the memory is received by the data processing apparatus operating in the power saving mode, responding to the received packet while maintaining the power saving mode;

when a packet corresponding to the return pattern stored in the memory is received by the data processing apparatus operating in the power saving mode, returning the data processing apparatus from the power saving mode to the normal power mode;

when a packet corresponding to the discard pattern stored in the memory is received by the data processing apparatus operating in the power saving mode, discarding the received packet while maintaining the power saving mode;

causing a packet information screen showing the packet received by the data processing apparatus to be displayed; and

registering a packet in the memory as any of the response pattern, the return pattern, or the discard pattern after the packet is selected by a user from the packet information screen.

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